

# Thyroid cancers in Korean pediatric populations with thyroid nodules

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## Introduction and objectives

Thyroid diseases are increased in pediatric populations recently. Thyroid nodules are also increased, and lower iodine intake might be an increased risk of thyroid nodules. South Korea is one of the adequate or excessive iodine nutritional state countries and high-iodine intake is related to papillary thyroid cancer. The incidence of thyroid cancer of South Korea has increased recently similar to worldwide trends and the proportion of thyroid papillary cancer has increased from 74-75.4% in 1996 to 97.9-98.3% in 2010. Childhood thyroid cancer is rare, and the incidence of thyroid cancer in pediatric population was reported as 20-26% of thyroid nodules worldwide. However, there have been few reports about thyroid nodule and cancer in pediatric population in Korea. In the present study, we firstly investigated to know the prevalence and clinical findings of thyroid nodule and cancer in Korean pediatric populations.

## Methods

We investigated medical records of 905 patients had goiter, thyroid nodule, thyroid mass and thyroid cancer lower than 18 years of age. One hundred and sixteen patients were excluded of incomplete medical records and 617 were also excluded of diffuse goiter without nodule. Of the rest, fine needle aspiration biopsy (FNAB) was not done in 38 patients, therefore 134 patients were included in the present analysis.

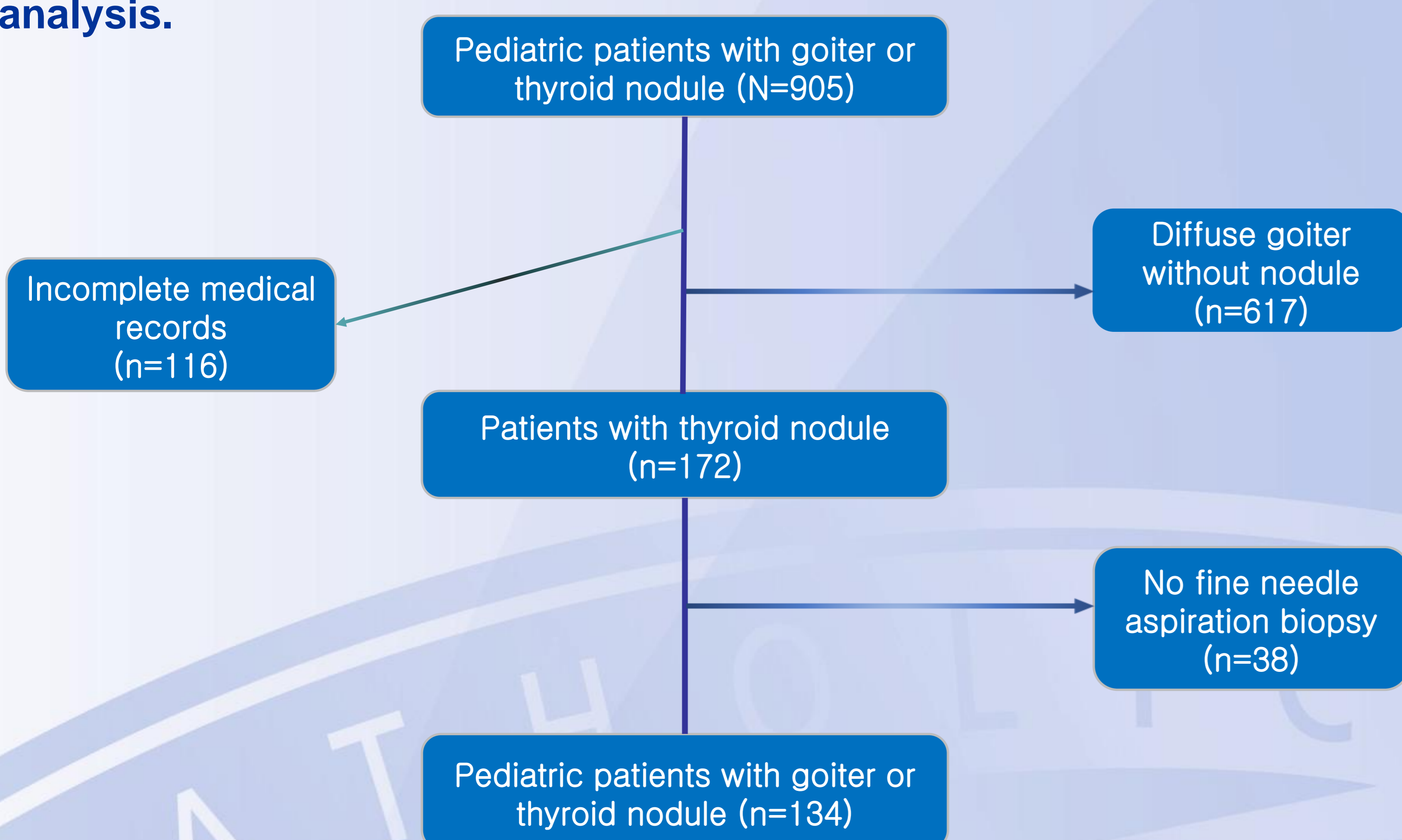


Fig.1. Flow chart of the study population with thyroid nodule

## Results

Female and male patients were 113 (84.3%) and 21 (13.7%), respectively, and mean age of the patients was  $16.1 \pm 2.3$  (8-18) years. Thyroidectomy was done to 36 patients and total thyroidectomy was done to 15 of the cancer patients. Of the 134 patients, 24 (18.0%) were finally diagnosed as thyroid cancer; 20 (83.3%) were papillary cancer and 4 (16.7%) were follicular cancers (Fig. 2). No one was exposed to irradiation and 4 had positive thyroid autoantibodies. FNAB revealed malignant in 22 of them, and 2 was reported as benign on FNAB at first, however finally diagnosed as follicular cancer. Otherwise, 13 patients were suspected to malignant on FNAB, the final pathologic diagnosis was nodular hyperplasia. We tried to compare clinical parameters in the two groups (malignancy vs benign group). Thyroid function test and the size and number of the nodules were not different in the two groups. Cystic nature of the nodules was related to benign. Cervical lymphadenopathy and irregular nodular margin were higher in malignant than in benign nodules (Table 1). Although some FNAB findings were discordant to the final diagnosis, 85.1% of FNAB findings were concordant to the final diagnosis. In regression analysis, FNAB malignant finding was highly suggestive of malignant nodule (Table 2).

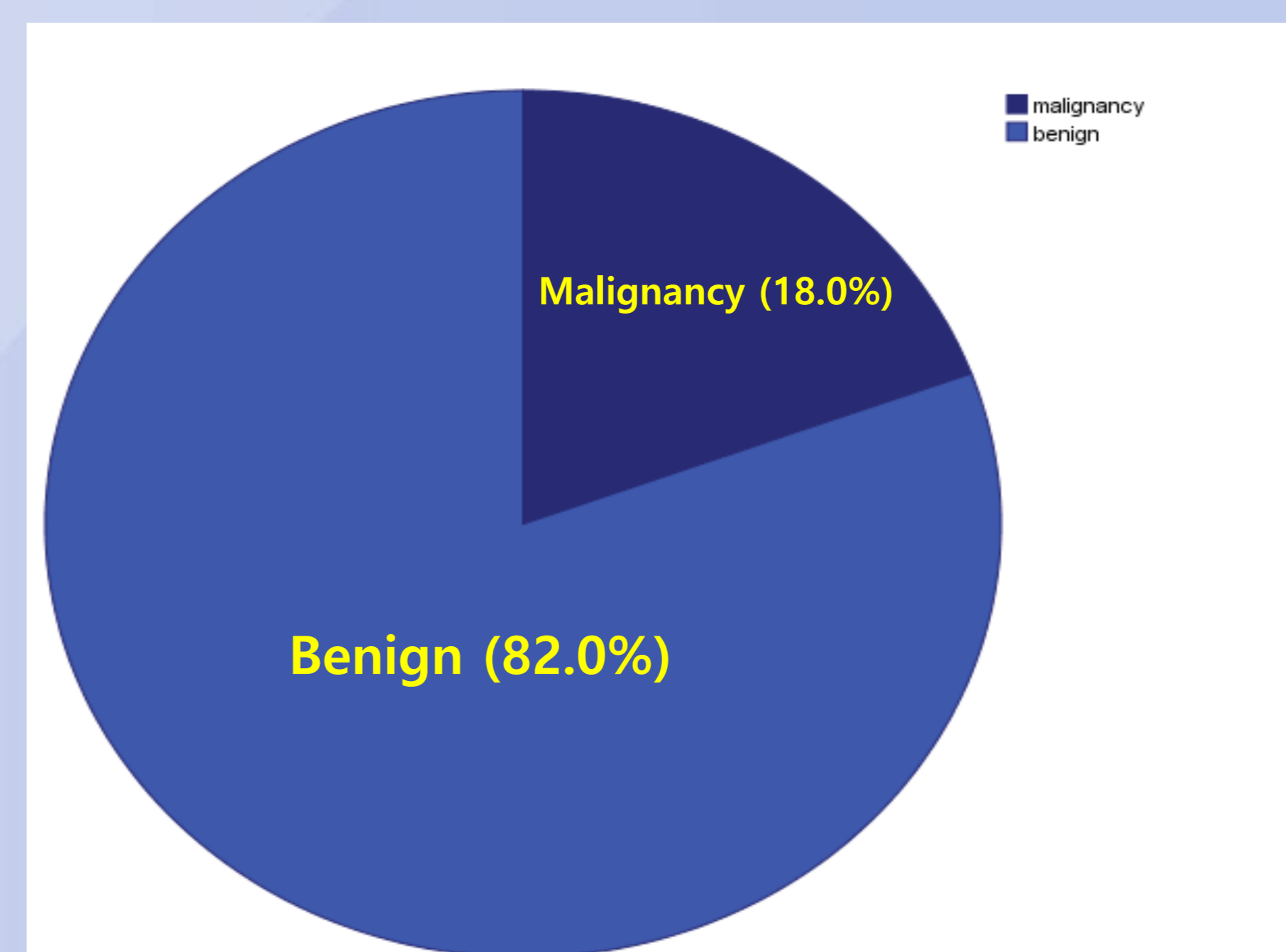


Fig. 2. Percentage of malignancy in Korean pediatric patients with thyroid nodules

Table 1. Comparison of the features of malignant and benign nodules

	Benign	Malignancy	P value
Sex (%)			0.394
Female	91 (82.7)	22 (91.7)	
Male	19 (17.3)	2 (8.3)	
Age	16.1 ± 3.1	16.1 ± 2.2	0.972
fT4	1.3 ± 0.3	1.2 ± 0.5	0.539
T3	1.5 ± 0.8	1.2 ± 0.4	0.096
TSH	1.8 ± 1.5	3.4 ± 1.4	0.923
Nodule size	2.1 ± 1.2	2.2 ± 1.3	0.682
No of nodule	1.3 ± 0.6	1.8 ± 0.4	0.892
Cervical lymphadenopathy	17 (15.5)	11 (45.8)	0.006
Characteristics of nodule			
Hypoechoic solid	80 (72.7)	23 (99)	0.064
Irregular margin	4 (3.6)	6 (25)	0.002
Cystic	39 (35.5)	0 (0)	<0.001
Calcification (%)	11 (10.0)	5 (20.8)	0.098
Location			0.089
Left lobe	44 (40.0)	4 (16.7)	
Right lobe	56 (50.9)	17 (70.8)	
Both or isthmus	10 (9.1)	3 (12.5)	
FNAB finding			<0.001
Benign	92 (83.6)	2 (8.3)	
Malignant	13 (11.8)	22 (91.7)	
Undefined	5 (4.6)	0 (0)	
No of patients (N=124)	110 (82.0)	24 (18.0)	

Table 2. Predictors of malignancy in patients with thyroid nodule at logistic regression analysis

	OR (95% CI)	P value
Cervical lymphadenopathy	5.417 (1.140 - 25.747)	0.034
Cystic nodule	0.154 (0.023 - 1.044)	0.055
Irregular margin	4.909 (0.888 - 27.129)	0.068
FNAB malignancy	50.377 (9.072 - 279.755)	<0.001

## Conclusions

The incidence of thyroid cancer was comparable in Korean pediatric populations to that of worldwide report of pediatric populations with thyroid nodules. Papillary thyroid cancers are dominant in Korean pediatric populations but lesser prevalent than in Korean adults. Cervical lymphadenopathy increases malignancy risk, and as is well known, FNAB was highly diagnostic to predict the nodules to be malignant.

\* We declare no conflict of interest.

## References

- Mussa A, De Andrea M, Motta M, Mormile A, Palestini N, Corrias A. Predictors of malignancy in children with thyroid nodules. *J Pediatr* 2015;167:886-92.
- Haugen BR, Alexander EK, Bible KC, Doherty GM, Mandel SJ, Nikiforov YE, et al. 2015 American Thyroid Association Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer. *Thyroid*. 2016 Jan;26(1):1-133.